

### SHRI GURU RAM RAI UNIVERSITY DEHRADUN







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# **SGRR UNIVERSITY**

# Brochure of Value-Added Courses

## **School of Agricultural Sciences**



### **ABOUT THE SCHOOL**

School of Agricultural Sciences is a prime centre of teaching & learning for those candidates who want to frame their career in mega agriculture sector of the world. Besides quality teaching we have sharp focus on Research & Extension activities for farmer's welfare in agriculture and allied fields. The Department has well qualified teaching and non teaching staff, agriculture farm of 25 acre, well equipped labs, Mushroom cultivation centre as well as senile orchards of litchi, guava, mango, citrus etc. within campus premises. We have a well-established Hi-tech poly-house & Nursery for off-season cultivation of vegetables and ornamentals.

School of Agricultural Sciences, a constituent School of Shri Guru Ram Rai University provide a conducive teaching learning environment with state of the art infrastructure and facilities for imparting quality education since inception by focusing on making our students a good human being and successful professionals in various fields of Agricultural Sciences and to generate and disseminate knowledge to meet the demands of farmers and stakeholders for sustainable agriculture.

Within the six departments in School of Agricultural Sciences offer undergraduate, post graduate and PhD programs all with aimed to meet to develop well- trained manpower for academics, agro-based industry and extension-oriented applications as recommended by the fifth Dean's committee guidelines of Indian Council of Agricultural Research (ICAR), New Delhi.



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### INTRODUCTION

The ever-changing global scenario makes the world more modest and needs high levels of lateral thinking and the spirit of entrepreneurship to cope up with the emergent challenges. Many a times, the defined skill sets that are being imparted to students today with Programme Specific Objectives in educational institutions become redundant sooner or later due to rapid technological advancements. No university curriculum can adequately cover all areas of importance or relevance. It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes.

### **Objectives The main objectives of the Value-Added Course are:**

- To provide students an understanding of the expectations of industry.
- ✓ To improve employability skills of students.
- ✓ To bridge the skill gaps and make students industry ready.
- ✓ To provide an opportunity to students to develop inter-disciplinary skills.
- $\checkmark$  To mould students as job providers rather than job seekers.

Course Designing The department interested in designing a Value Added Course should undertake Training Need Analysis, discuss with the generic employers, alumni and industrial experts to identify the gaps and emerging trends before designing the syllabus.

#### Conduction of value added courses :

Value Added Course is not mandatory to qualify for any programme and the credits earned through the Value-Added Courses shall be over and above the total credit requirement prescribed in the curriculum for the award of the degree. It is a teacher assisted learning course open to all students without any additional fee.

Classes for a VAC are conducted during the RESERVED Time Slot in a week or beyond the regular class hours The value-added courses may be also conducted during weekends / vacation period. A student will be permitted to register only one Value Added Course in a Semester.

student will be encouraged to opt for the VAC offered by his/her parent Department/Faculty. Industry Experts / Eminent Academicians from other Institutes are eligible to offer the value-added course. The course can be offered only if there are at least 5 students opting for it. The students may be allowed to take value added courses offered by other departments after obtaining permission from Dean offering the course. The duration of value added course is 30 hours with a combination 18 hours (60%) of theory and 12 hours (40%) of practical. However, the combination of theory and practical shall be decided by the course teacher with the approval of the Dean



### **GUIDELINES FOR CONDUCTING VALUE ADDED COURSES**

- Value Added Course is not mandatory to qualify for any program.
- It is a instructor supported learning course open to all students without any added fee.
- Classes for VAC will be conducted during the **RESERVED** Time Slot in a week or beyond the regular class hours.
- The value-added courses may be also conducted during weekends / vacation period.
- ✤ A student will be permitted to register only one Value Added Course in a Semester.
- Students may be permitted to enrol in value-added courses offered by other departments/ Schools after obtaining permission from the Department's Head offering the course.

### **DURATION AND VENUE**

- The duration of value-added course should not be less than 30 hours.
- The Dean of the respective School shall provide class room/s based on the number of students/batches.

VAC shall be conducted in the respective School itself.

### **REGISTRATION PROCEDURE**

The list of Value-Added Courses, along with the syllabus, will be available on the University Website. A student must register for a Value-Added Course offered during the semester by completing and submitting the registration form. The Department Head shall segregate according to the option chosen and send it to the Dean of the school offering the specific Value-Added Courses.

- Each faculty member in charge of a course is responsible for maintaining Attendance and Assessment Records for candidates who have registered for the course.
- The Record must include information about the students' attendance and Assignments, seminars, and other activities that were carried out.
- The record shall be signed by the Course Instructor and the Head of the Department at the end of the semester and kept in safe custody for future verification.
- Each student must have a minimum of 75% attendance in all courses for the semester in order to be eligible to take certificate.



- Attendance requirements may be relaxed by up to 10% for valid reasons such as illness, representing the University in extracurricular activities, and participation in NCC.
- The students who have successfully completed the Value Added Course shall be issued with a Certificate duly signed by the Authorized signatories.







# SCHOOL OF AGRICULTURAL SCIENCES



### **Production and Post Harvest** Handling of Mushroom

### Course Code : VCASAS001

### **Course Objectives:**

- 1. To enable the trainees to identify edible and poisonous mushroom.
- 2. To provide hands on training for the preparation of bed for mushroom cultivation , pest and disease control and harvesting and post harvesting management.
- 3. To provide awareness about the market trend of mushroom.
- 4. To give the exposure of experiences of experts in the field and to functioning in mushroom farm.
- 5. To learn a mean of self-employment and income generation.

### **Course outcomes:**

- 1. To acquaint with the nutrient value of mushroom.
- 2. To understand the morphology and types of mushroom.
- 3. To develop the skill of spawn production technology.
- 4. To aware the identification of edible and poisonous mushroom.
- 5. To learn the prospects and scope of mushroom cultivation in small scale industry.
- 6. To understand the diseases and post harvest handling of mushroo

### Module-I

Introduction – History of mushroom cultivation; Classification and distribution of mushroom; life cycle of mushroom. Identification of poisonous mushrooms.

### Module- II

Spawn preparation - Isolation of pure culture; Nutrient media for pure culture; layout of spawn preparation room; raw material of spawn; sterilization; preparation of mother spawn and multiplication

#### Module- III

Cultivation of mushroom, layout of mushroom shed - small scale and large scale production unit. Types of raw material – preparation and sterilization; Mushroom bed preparation – maintenance of mushroom shed; harvesting method and preservation of mushrooms.

### Module-IV

Nutrient values of mushroom – protein, carbohydrate, fat, fibre, vitamins and amino acids contents; short and long term storage of mushroom; preparation of various dishes from mushroom. Medicinal value of mushroom – cultivation, extraction,



isolation and identification of active principle from mushroom. Pharmacological and economic values of mushroom.

### **Module-V**

Cultivation of following types of mushroom – milky mushroom; oyster mushroom, button mushroom and any one medically valuable mushroom.

### **Reference Books:**

- 1. Agri. Information Service, Himachal Pradesh, Shimla. How to grow mushroom Bull. Agri. Inf serv. 1, 1972.
- 2. AOAC Official Methods of Analysis of Association of Official Agricultural Chemists, 12th ed. Published by the Association , Washington, 1975.
- 3. College of Agri. Cultivation of tropical mushrooms;Bull. Tamilnadu Agri. University, Coimbatore, Tamilnadu, 1968.
- 4. Paul Stamets, J.S. and Chilton, J.S. 2004. Mushroom cultivation A practical guide to growing mushrooms at home, Agarikon Press.
- 5. Tewan and Pankaj Kapoor S.C. 1993. Mushroom cultivation. Mittal Publication. Delhi.
- 6. Marimuth et al., 1991. Oyster Mushrooms. Dept. of Plant pathology, TNAU, Coimbatore.
- 7. Nita Bahl. 1988. Hand book of Mushrooms, 2nd Edition, Vol I & II.
- 8. Shu Fing Chang, Philip G. Miles and Chang, S.T. 2004. Mushrooms Cultivation, nutritional value, medicinal effect and environmental impact. 2nd ed., CRC press.



### Conservation, development and Economic prospects of Medicinal and Aromatic Plants

### Course Code : VCASAS002

### **Course Objectives:**

- 1. To acquire knowledge on medicinal and aromatic plants
- 2. To bridge the gap between industry and academia with technology for conservation, development, processing and marketing of MAPS.
- 3. To provide an opportunity for self employment and entrepreneurship

### **Course Outcome:**

- 1. To enable the students/ participants to know the Medicinal and Aromatic Plants (MAPs).
- 2. To provide knowledge for conservation, development, extraction of MAPs; its processing & value added products.
- 3. To provides the students awareness about the marketing trend of MAPs.
- 4. To help the students to learn about the self-employment and income generation.

**Module I**: Importance and Scope of MAPS. Classification of medicinal and aromatic plants.

**Module II:** Conservation and development practices, processing and utilization of medicinal and aromatic plants

**Module III:** Extraction, and preservation of crude drugs. Classification and estimation of phyto-constituents of crude drugs.

Module IV: Traditional and advance knowledge about the MAPS

**Module V:** Post-harvest technology in medicinal plants scope and importance. Importance of herbal marketing -Future prospects and constraints of the herbal drug industry

Practical:

- 1. Survey of field for identification of MAPs.
- 2. Collection of plant parts for extraction of crude extract
- 3. Estimation of phyto-constituents on qualitative basis.
- 4. Post -harvest practices and estimation of total yield.
- 5. Conservation of MAPs by developing herbal garden (ex situ conservation).



### **Reference Books:**

- 1. Faroogi, A.A. and B. S. Sreeramu, 2004. Cultivation of medicinal and aromatic crops. Revised edition, Universities Press (India) Private Limited, Hyderabad
- 2. Harbone, J.B. 1998. Phytochemical Methods: A guide to modern techniques of plant analysis. 3rd Supplementary Reading: Edn., Springer (India) Private Limited, New Delhi.
- 3. WHO, 2002. Quality control methods for medicinal plant materials, World Health Organization, Geneva, A.I.T.B.S., Publishers and Distributors, New Delhi.
- 4. Halliwall, B. and J.M.Gutteridge. 1985. Free radicals in Biology and medicine. Oxford University.





### Hill Agriculture

### Course Code: VCASAS003

### **Course Objectives:**

- 1. To impart the basic knowledge about agro-ecological zones of India.
- 2. To develop understanding of mechanization for hilly areas.
- 3. To develop the skills to analyze soil and water conservation techniques.
- 4. To impart the knowledge of improved crop varieties for doubling farmers income.

### **Course outcomes:**

- 1. Identify the crops, farm implements and manures.
- 2. Summarize improved for crop production technologies.
- 3. Prepare farming system models for hill agriculture.
- 4. Integrate alternate land use system and watershed management.

**Module I:** Agro-climatic and topographical parameters prevailing in hills of India. Soil composition, pH, texture, fertility and productivity of soils in hilly region. Soil and weather constraints in hills of India. Different tillage operations required for sustainable agriculture in hills.

**Module II:** Improved crop Production technology of field crops, vegetable crops and fruit crops suitable for temperate regions viz. millets, cereals, pulses, Medicinal plants, spices and condiments, traditional fruits and vegetables grown wildly in forest of hills.

**Module III:**Role of women in hill agriculture, limitations and opportunities for agribusiness related in hills, Role of government and non governmental bodies for upliftment of farmers in hills, Research and extension programmes for enhancing farm returns.

**Module IV:** Integrated hill farming and watershed management . Alternate land uses for community needs and conservation. Wild animal menace in agriculture and strategies for its management.goverment shames for farmers. Organic farming in hills.

### **Reference Books**

- 1. Hartmann, H.T., Kester, D.E., Davies, F.T. and Greneve, R.L. 1997. Plant propagation Principles and Practices, Prentice Hall of India Private Ltd., New Delhi.
- 2. Prasad, S. and Kumar, V. 1999. Green House Management of Horticultural Crops, AgroBios India, Jodhpur.
- 3. Kanwar, J.S. (Ed.). 1976. Soil Fertility: Theory and Practice. ICAR.



- 4. Olson, R.A., Army, T.S., Hanway, J.J. & Kilmer, V.J. 1971. Fertilizer Technology and Use. 2nd Ed. Soil Sci. Soc. Am. Madison.
- 5. Prasad, R., & Power, J.F. Soil Fertility Management for Sustainable Agriculture. CRC Press





# Agripreneurship Development in Beekeeping

### **Course Code: VCASAS004**

### **Course Objectives:**

- 2. To impart the basic knowledge about honey bee species and bee flora
- 3. To develop understanding about handling of honey bee keeping equipment's & management of diseases & pests of honey bee
- 4. To develop the skills in scientific methods of bee keeping and extraction of honey
- 5. To impart the knowledge regarding apiary management by month wise calendar

### **Course outcomes:**

- 1. Understand importance of beekeeping, Selection of bee species & Identification of bee flora and location of site.
- 2. Handling of bee keeping equipments, Management of insects and diseases & natural enemies.
- 3. Scientific methods of bee keeping & honey processing.
- 4. Seasonal apiary management by month wise calendar.

**Module I:** Introduction to Bee Keeping, History, Present scenario & scope, Selection of bee species & races, identification of bee flora and location of site. **Module II:** Honey bee keeping equipments, Building & division of comb and colony, Management of insects and diseases and nuisance in bee hives.

**Module III:** Scientific methods of bee keeping, Bee Boxes Maintenance, Collection and preservation of honey,

**Module IV:** Month wise calendar of operations in bee keeping, Seasonal Management of honey bees.

### **Reference Books:**

- 1. Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, IIIinois.
- 2. Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.



### **Protection of Plant Varieties and Farmer's Rights**

### Course Code : VCASAS005

**Course Objective:** Creating awareness and developing skill about plant variety protection and rights of breeder's, researcher's and farmer's.

### **Course outcomes:**

1. Upon successful completion of course students are able to identify the DUS characters of crop plants.

2. Students will aware about breeder's, researcher's and farmer's rights in India.

3. Students will get the skill to register and protect the varieties of crop plant

**Module I:** Historical background and importance of plant variety protection, Protection of plant varieties and farmer's rights authority, registration of plant varieties and essentially derived varieties.

**Module II:** Breeder's, researcher's and farmer's rights in India, compulsory licence, Appellate Tribunal, Infringement, offences and penalties.

**Module III** (Practical): Procedure to protect plant varieties, DUS testingprinciples and applications in agricultural crops, visit to DUS testing centre.

### **Reference Books:**

1. Protection of Plant Varieties and Farmer's Rights Act 2001. Ministry of Law, Justice and Company Affairs (Legislative Department). New Delhi, the 30th October, 2001.

2. Protection of Plant varieties and Farmers Rights Act, 2001, along with rules, 2003 & Regulations, 2006. Bare Act. Professional Book Publishers, New Delhi.

3. Plant Variety Journal of India. Protection of Plant Varieties & Farmer's Rights Authority, New Delhi

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### On farm practices of agricultural Waste management

### Course Code: VCSAS006

#### **Course Objectives:**

- 1. To impart knowledge to students on various methods of agricultural waste management for eco friendly energy and manure production.
- 2. To develop understanding of some identified areas of organic farming
- 3. To develop skills at village level on organic management practices with special focus on soil health base crop management
- 4. To create job opportunities in organic sector particularly in the area of organic production

### **Course outcomes :**

- 1. To acquaint with on-farm resource management under organic farming.
- 2. To understand soil health base crop management
- 3. To develop the skill of input production and quality control.
- 4. To aware the traditional Biofertilizer, Biopesticides and Soil health promoters.
- 5. To learn the nutrient management and plant protection including formulation techniques.
- 6. To develop the skills at village level required for organic farming practices and related marketing economics.

### Module I :

Introduction, Concept, Philosophies, Principles and Need of organic farming

### Module II:

Soil health: the prime need in organic management. Organic farming an integrated approach. Traditional organic input preparation/formulation of Biofertilizer, biopesticides, plant health promoters like Panchgavya, Beejamrut etc

### Module -III:

Manure preparation and introduction to compost. Methods of composting – vermicomposting, Shivansh khad - Factors involved, Infrastructure required, maturity parameters, value addition and application methods

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### Module IV :

Crop management, Nutrient Management and Pest Management and Multilayer cropping system base farm planning.

### Module V:

System of organic certification and inspection. Standards and guidelines of NPOP (National Programme for organic production). Branding of rural products, FSSAI, marketing and packaging of organic produce.

### **References:**

- Dahama, A.K.2009. Organic farming for sustainable agriculture, Agrobros publishers.
- Mukund Joshi. 2015. Sustainability to Organic Farming, Kalyani publication
- Nicholas lampkin 1994. Organic farming. Farming press London. Arun kumar Sharma 2008. A Hand book of organic farming. Agrobios Publishers.
- SP.Palaniappan and K Annadurai.2008.Organic Farming: Theory and Practice.2008. Scientific Publishers.
- Stockdale, E et al., 2000. Agronomic and environmental implications of organic farming systems. Advances in Agronomy, 70, 261-327
- S. R. Reddy.2020. Principles of Organic farming, Kalyani publication
- T.D. Pandey et al. 2013. Organic farming, Kushal Publication and distributers, Varanasi, U.P.
- Veeresh, G.K. 2010. Organic farming, Cambridge university press.

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# Novel techniques of fruits and vegetables processing

### Course code: VCASAS007

### Course objective:

- 1. To give the students a way to evaluate and understand ecotourism in their context.
- 2. To increase the benefits and to reduce the negative impacts caused by tourism for destinations.
- 3. This can be achieved by: Protecting natural environments, wildlife and natural resources when developing and managing tourism.

### **Course outcomes**

- 1. To aware with the history, importance and principles of preservation.
- 2. To learn the prospects and scope of fruit and vegetable processing sector.
- 3. To develop skill of various processing methods.
- 4. To aware with develop procedure of various fruits and vegetable products.
- 5. To acquaint with organoleptic evaluation of processed products.
- 6. To understand technologies of fruit and vegetable processing and its role in providing better quality produce to the consumer .

#### Module I :

History, importance and scope of preservation of fruits and vegetables, Principles of preservation, Methods of preservation-Physical, Chemical, Fermentation, other methods.

### Module II

Role of preservatives, fruit color, flavors, chemicals, salt, sugar and vinegar. Study of containers for packaging of preserved products- Tin cans, Glass containers, plastic and polythene pouches and their advantages and disadvantages.

#### Module III

Canning of fruits and Vegetables, Drying and Dehydration of fruits and Vegetables Preparation of Juice from Fruits and Vegetables, Squash & cordial. Sensory or organoleptic evaluation of processed products.

#### Module IV

Preparation of Jam, Jelly and marmalade, Preparation of unfermented fruit beverages, juice Ready to serve (RTS), nectar, Fruit juice powder, fruit juice concentrate. Preparation of preserve and candy from Fruits and Vegetables. Preparation of tomato

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products - Tomato juice, Tomato puree and paste , Tomato sauce and ketchup , Tomato chutney , Tomato soup , Tomato chilli sauce.

### **References :**

- Battacharjee, S. K. and De, L. C. 2005. Post Harvest Technology of Flowers and Ornamentals Plants. Ponteer Publisher, Jaipur, India.
- Bhutani RC. 2003. Fruit and Vegetable Preservation. Biotech Books
- Fellows, P. J. 1998. Food Processing Technology: Principles and Practices. Ellis Horwood.
- Hulme, A.C. 1970. Food Science & Technology- A Series of Monograph: The Biochemistry of
- Fruits and their Products (Vol. 1). Academic Press London & New York.
- Jacob, J. P. 2008. A Handbook on Post Harvest Management of Fruits and Vegetables. Daya
- Publishing House, Delhi.
- Kitinoja, L. and Kader, A. A. 2003. Small-Scale Postharvest Handling practice: A Manual for
- Horticulture Crops (4th edt.). US Davis, PHT Research and information Center.
- Mitra, S. K. 1997. Post Harvest Physiology and Storage of Tropical and Subtropical Fruits. CAB
- International.
- Ranganna, S. 2017. Handbook of Analysis and Quality Control for Fruit and Vegetable Products (2nd Edt.). McGraw Hill Education.
- Saraswathy, S. 2008. Post harvest Management of Horticultural Crops. Agribios (India).
- Shanmugavelu, K. G., Kumar, N. and Peter, K.V. 2002. Production Technology of Spices and Plantation Crops. Agrobios (India).
- Sharma, N. and Mashkoor, A. M. 1998. Post Harvest Diseases of Horticultural Perishables. International Book Distributing Co., Lucknow.
- Srivastava, R.P. and Sanjeev, K. 2017. Fruit and Vegetable Preservation: Principles and Practices. CBS Publishers & Distributors.
- Stanley, J. K. 1998. Post Harvest Physiology of Perishable Plant Products. CBS, New Delhi.
- Thomposon, A. K. 1996. Post Harvest Technology of Fruits and Vegetables. Blackwell Science.
- Verma, L. R. and Joshi, V. K. 2000. Post Harvest Technology of Fruits and Vegetables (Vol. I & II). Indus Publishing Co., New Delhi

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### Basic Concepts in Laboratory Techniques

### Course Code : VCASAS008

### **COURSE OBJECTIVES**

- 1. To impart the basic knowledge about safety measures and good laboratory practices.
- 2. To develop understanding of basics of sterilization techniques.
- 3. To develop the skills to analyze different methods of preparations of solutions.
- 4. To impart the knowledge of handling sophisticated laboratory equipment's and instruments

### **COURSE OUTCOME**

Upon successful completion of the course students are able to acquaint knowledge and develop skills of commonly used techniques in laboratory

### Module I :

Safety measures while in Lab; Handling of chemical substances; Use of burettes, pipettes, measuring cylinders, flasks, separatory funnel, condensers, micropipettes.

### Module II:

Washing, drying and sterilization of glassware; Drying of solvents/ chemicals; Weighing and preparation of solutions of different strengths and their dilution.

### Module III:

Handling techniques of solutions; Preparation of different agro-chemical doses in field and pot applications; Preparation of solutions of acids; Neutralization of acid and bases; Preparation of buffers of different strengths and pH values.

### Module IV:

Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, water bath, Hot air oven, Autoclave, centrifuge, spectrophotometer etc.

### **References :**

1. Furr AK. 2000. CRC Hand Book of Laboratory Safety. CRC Press.

2. Gabb MH and Latchem WE. 1968. A Handbook of Laboratory Solutions. Chemical

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Publ. Co.

- 4. Lippincott, W. T., Gailey, K. D., Meek, D. W., and Whitten, K. W. (1984). Experimental general chemistry . Philadelphia, PA: Saunders.
- 5. Willard, H. H., Merritt, L. L., Jr., Dean, J. A., and Settle., F. A., Jr. (1988). Instrumental methods of analysis (7th Ed.). Belmont, CA: Wadsworth.

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